

## Part 1, General (US Underwater Grout)

### 1.01 Work Included

- A. Furnish all materials, labor, tools, and equipment to patch or fill interior / exterior surfaces and voids as designated by the owner.

### 1.02 Related Work

- A. Joint fillers
- B. Crack repair

### 1.03 Quality Assurance

- A. Provide a notarized certificate stating that the portland cement grout meets the specified requirements and have the manufacturer's current printed literature on the specified product.
- B. Portland Cement grout shall be tested by a certified testing laboratory, on a batch basis, to assure the product has been manufactured as specified on manufacturer's printed literature.
- C. Complete laboratory test reports, from an independently qualified testing laboratory, shall be made available for the specified product.

### 1.04 Delivery, Storage, and Handling

- A. Deliver the specified product in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers.
- B. Store and condition the specified product as recommended by the manufacturer.

### 1.05 Job Conditions

- A. Environmental Conditions: Do not apply material in rainfall or if the ambient temperature will fall below 40 degrees F. within 24 hours of application.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the portland cement grout.

## Part 2, Products

### 2.01 Acceptable Products

- A. US Underwater Grout as supplied by U.S. Concrete Products, LLC, Baltimore, Maryland.
- B. Substitutions: The use of other than the specified product will be considered providing the contractor requests its use in writing to the Engineer. This request shall be accompanied by a certificate of compliance from an approved independent testing laboratory that the proposed substitute product meets or exceeds the specified performance criteria, tested in accordance with the specified test standards.

### 2.02 Performance Criteria

- A. Properties of the mixed portland cement grout:
  - 1. Working Time: 30 minutes
  - 2. Finishing Time: 20-60 minutes
  - 3. Color: grout gray
  - 4. Flow: <30 seconds (CRD C 621)
- B. Properties of the cured portland cement grout:
  - 1. Compressive Strength @ Fluid Consistency (ASTM C-109 Modified)
    - a. 1 day 500 psi
    - b. 7 days 4000 psi
    - c. 28 days 6000 psi
  - 2. Splitting Tensile Strength (ASTM C-496) at 28 days: 800 psi min.
  - 3. Flexural Strength (Modulus of Rupture)(ASTM C-78) at 28 days: 1000 psi min.
  - 4. Bond Strength (ASTM C-882 Modified) at 28 days: 1800 psi min.
  - 5. Thermal Compatibility (ASTM C-884 Modified): passes test min.
  - 6. Chloride Permeability (ASTM C 1202): 940 Coulombs

## 2.03 Materials

### A. Portland cement grout:

1. US Underwater Grout shall be a blend of selected portland cements, specially graded aggregates admixtures for controlling setting time, water reducers for workability.
2. The ratio of water to US Underwater Grout shall be 1:3 by weight.
3. The material shall not contain asbestos, chlorides, nitrates, added gypsum, added lime, or high aluminum cements.
4. The material shall be non-combustible, either before or after cure.
5. The portland cement grout shall be supplied in a factory proportioned unit.
6. The portland cement grout must be able to be finished with a trowel.
7. The portland cement grout must be placeable from 1/2 in. in depth up to full depth.

## Part 3, Execution

### 3.01 Surface Preparation

- A. The surface must be mechanically prepared. Areas to be grouted or overlaid must be clean and sound. All loose and deteriorated grout shall be removed by mechanical means approved by the Engineer. Chip grout substrate to obtain a surface profile of 1/2 in. with a new aggregate fractured surface. Be sure the area to be patched or overlaid is not less than 1/2 in. in depth. Sandblast reinforcing steel to remove all contaminants and rust. Where reinforcing steel is encountered, the following procedures will be used. If half of the diameter of the rebar is exposed, chip out behind the reinforcing steel. The distance chipped behind the rebar will be equal to or exceed the minimum placement depth of the approved material.
- B. Cracks in the substrate in the area of the patching or overlay work must be treated as directed by the Engineer.
- C. Extend all existing control and expansion joints through any patch or overlay. Install new joints as directed by the Engineer. Fill all joints as directed by the Engineer.

### 3.02 Application

- A. For each 50 lb bag of **US Underwater Grout** add up to 128 fluid ounces of water In a clean, appropriate, high speed, mechanical mixer add 75% of pre-measured water. With the mixer operating, add the **US Underwater Grout**. Add remaining water as needed to achieve the desired consistency. Continue to mix until a homogeneous consistency has been achieved. Do not add additional water and do not mix more than six minutes. Material should be continually re-circulated prior to placement to

avoid thickening and settlement. Do not over mix. Should small quantities be required, be sure to proportion admixture, water and Portland cement accordingly.

- B. Placement Procedure: Mortar and/or grout must be scrubbed into substrate filling all pores and voids. While the scrub coat is still plastic, force material against edge of repair, working toward center. After filling, consolidate, then screed. Allow mortar to set to desired stiffness. Then finish with trowel, manual or power for smooth surface.
- C. Curing is not required under most conditions. However, if ambient condition might cause premature surface drying-high winds, high temperatures, direct sunlight, low humidity, etc., use a fine mist of water, wet burlap, or non-solvent, water based curing compound, which has been pre-approved by the Engineer.
- D. Adhere to all limitations and cautions for the portland cement grout in the manufacturers current printed literature.

### 3.03 Cleaning

- A. The uncured portland cement grout can be cleaned from tools with water. The cured portland cement grout can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.